

**UTILITY
PATENT APPLICATION
TRANSMITTAL**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

1247-0862-6E

First Inventor or Application Identifier

Rémy BADIN

Title

HOLLOW GLASS PRODUCT WITH OFFSET COLLAR AXIS
AND PROCESS OF MANUFACTURING THE SAME

3598 U.S. PTO
09/534973

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APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO:

Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

Fee Transmittal Form (e.g. PTO/SB/17)

(Submit an original and a duplicate for fee processing)

ACCOMPANYING APPLICATION PARTS

2. ☒ Specification

Total Pages

11

6. ☐ Assignment Papers (cover sheet & document(s))

7. ☐ 37 C.F.R. §3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)

8. ☐ English Translation Document (if applicable)

9. ☒ Information Disclosure Statement (IDS)/PTO-1449 ☒ Copies of IDS (2) Citations

10. ☐ Preliminary Amendment

11. ☒ White Advance Serial No. Postcard

12. ☐ Small Entity Statement(s) ☐ Statement filed in prior application. Status still proper and desired.

13. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)

14. ☒ Other: Request for Priority
List of Inventors' Names and Addresses
Translation of Category

4. ☐ Oath or Declaration

Total Pages

a. ☐ Newly executed (original or copy)

b. ☐ Copy from a prior application (37 C.F.R. §1.63(d))
(for continuation/divisional with box 15 completed)

i. ☐ DELETION OF INVENTOR(S)

Signed statement attached deleting inventor(s) named
in the prior application, see 37 C.F.R. §1.63(d)(2) and
1.33(b).

5. ☐ Incorporation By Reference (usable if box 4B is checked)

The entire disclosure of the prior application, from which a copy of the
oath or declaration is supplied under Box 4B, is considered to be part
of the disclosure of the accompanying application and is hereby
incorporated by reference therein.

15. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below:

☐ Continuation

☐ Divisional

☐ Continuation-in-part (CIP)

of prior application no.:

Prior application information:

Examiner:

Group Art Unit:

16. Amend the specification by inserting before the first line the sentence:

☐ This application is a ☐ Continuation ☐ Division ☐ Continuation-in-part (CIP)
of application Serial No. Filed on

☐ This application claims priority of provisional application Serial No.

Filed

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TITLE OF THE INVENTION

HOLLOW GLASS PRODUCT WITH OFFSET COLLAR AXIS AND PROCESS OF
MANUFACTURING THE SAME

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CROSS-REFERENCE TO RELATED APPLICATION

The present application claims priority under 35 U.S.C. §119 to French Patent
Application No. 99/03718, filed March 25, 1999, entitled "Hollow Glass Product With Offset
Collar Axis." The contents of that application are incorporated herein by reference in their
entirety.

10

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention pertains to a hollow glass product and a process of
manufacturing the same.

15

Description of the Background

The traditional processes that are extensively used at the present time to fabricate the
aforementioned products utilize so-called I.S. (Individual Section) machines and are known
under the names of "blown-blown" and "press-blown" processes. During the first stage of
these traditional processes, a ball or drop of glass is introduced into a roughing mold and
shaped into a form of a rough mold. The base of the roughing mold is extended by a collar
mold used for shaping an upper opening part of a product to be fabricated in the rough mold.

20

The collar mold also has the function of gripping the rough mold in a subsequent
operation of turning over the rough mold prior to the second stage in which the roughing
mold is replaced by a finishing mold. In the finishing mold, the rough mold is shaped into a
final hollow product by blowing.

25

Among the processes currently being used, the "blown-blown" process can be broken
down into the following stages:

- *loading*: a drop or ball of glass enters due to the effect of its own weight into a first mold (a roughing mold) through its upper end which corresponds to the bottom of a final product such as a bottle, etc.;

- *compression*: after loading, a rough bottom section closes the roughing mold; then a blast of compressed air forces the drop of glass in the roughing mold through the intermediary of the roughing mold into the lower part of the mold in which a collar of the final product is later formed; this compression also ensures good thermal contact between the drop of glass and the roughing mold;

- *perforation*: a punch of small dimensions, taking up approximately the height of the collar and fitted at the lower part of the roughing mold, detaches from the lower part of the roughing mold, thereby leaving room for compressed air to be delivered, the compressed air pushes in front of it the hot, less viscous glass located in the vicinity of the axis of the roughing mold, while the more viscous cold glass that has been cooled upon contact with the mold remains in place; a blank or a rough mold of the final product is thereby produced;

- *transfer*: when the blank is sufficiently cooled in the roughing mold for handling, the blank is transferred into a second mold (a finishing mold) which has a shape of the final product;

- *elongation and blowing*: once the blank is placed in the finishing mold, the blank is allowed to lengthen for a certain amount of time before blowing in order to give the shape of the product; this lengthening stage allows the glass to be distributed throughout the product;

- *extraction*: upon contact with the finishing mold, the glass cools quickly, and when its viscosity is sufficiently low, the product is extracted from the finishing mold.

The "press-blown" process differs from the "blown-blown" process only in the phase of shaping a blank or rough mold. In the "press-blown" process, a blank is obtained by compression of the glass in the closed roughing mold by means of a more or less lengthy punch that penetrates into the mold in the bottom of the latter through the collar mold. There are therefore no compression or perforation stage, and the opening of the product is formed in a single operation by this pressing.

These processes allow one to make products with shapes that are axisymmetrical or not. The device, which is used here as indicated above, comprises only one section of an individual section machine, which has several of them.

However, more and more complex shapes of products have been envisaged for applications of packaging in the perfume and cosmetic industries, in particular. According to the present invention, a collar would no longer have to be positioned at the end of a flask, jar, etc., but may be position on a side of their bodies.

The first purpose of the invention therefore consists of a glass product that includes a body and a collar; this product is distinguished by the fact that the axis of at least one part of the body and the axis of the collar are not parallel.

Advantageously, the aforementioned part of the body represents a substantial proportion of the quantity of glass constituting the product, that is, at least 20%, and preferably at least 60%.

According to the present invention, the axis of the at least one part of the body and the axis of the collar in the glass product form an angle equal to at least 60° but less than 180° , preferably between 90 and 150° .

As mentioned previously, a product according to the present invention includes a bottle, a flask or a jar in a preferred manner.

In order to fabricate this product, a collar mold is initially held in its traditional position in roughing and finishing molds, that is, in the vertical position of the axis of the collar mold at the lower end of the cavity of the roughing mold and at the upper end of the cavity of the finishing mold, respectively. Such an arrangement is difficult to achieve industrially, since it essentially requires, for many forms of implementation of the product of the invention, that a ball of molten material be introduced into the cavity of the roughing mold through a non-vertical entrance section of the roughing mold. This characteristic is prejudicial to the distribution of the molten material in a compact and homogeneous mass at the bottom of the cavity of the roughing mold and especially near the collar mold. In fact, the contact of the molten material with the walls of the cavity is increased, and therefore, the

cooling of the material by the mold also increases. The increased viscosity of the material that thereby results is harmful to the progression of the material toward the bottom of the cavity. In order to overcome such a problem, the inventors have offset the axis of the collar mold in the roughing mold and in the finishing mold with respect to their vertical axes.

5 Thus, a second object of the invention is to provide a fabrication process of a glass product as described previously, which includes the stages of:

 introducing a ball of molten material into the cavity of a roughing mold of which at least one input section for receiving the ball is approximately vertical;

 allowing the ball of molten material to thoroughly penetrate into the bottom of the
10 roughing mold, the bottom of the roughing mold including a part which corresponds to the collar of the final product;

 performing a collar by movement of a punch along a non-vertical axis;

 possibly carrying out blowing through the collar following the extraction of the punch for the purpose of definitive shaping of the blank;

 transferring the blank into a finishing mold by turning over the blank 180° with
15 respect to a horizontal axis; and

 performing blowing through the collar in order to give the product its final shape.

The allowing process described above may be assisted by blowing, for example, compressed air.

20 In conformity with the preferred characteristics of the process, the input section of the molten ball represents at least 20%, in a particularly preferred way, at least 60% of the total volume of this cavity, and the axis of translation of the punch forms an angle equal to at least 60° but less than 180°, preferably between 90 and 150° with respect to the vertical.

 A third object of the present invention is to provide an individual section machine
25 which can be used for the fabrication of a product as described above. Such an individual section machine includes a collar mold, a roughing mold in which at least one substantial upper part of the cavity is approximately vertical, and a finishing mold, wherein the collar mold is configured to be alternately positioned in the roughing and finishing molds such that

the axis of the collar mold forms an angle equal to at least 60° but less than 180° with respect to the vertical.

SUMMARY OF THE INVENTION

5 An object of the present invention is to provide a novel process for manufacturing a hollow glass object having the collar with an offset axis.

 Another object of the present invention is to provide a hollow glass object having the collar with an offset axis.

 Another object of the present invention is to provide an device for implementing the
10 novel manufacturing process described above.

 The first object may be accomplished by a process of manufacturing a hollow glass
product with an offset collar axis, including the steps of inserting molten material into a
cavity of a roughing mold, allowing the molten material to penetrate into a bottom portion of
the roughing mold, perforating a collar by moving a punch into the bottom portion of the
15 roughing mold along a non-vertical axis, extracting the punch from the bottom portion of the
roughing mold, thereby completing processes of shaping the molten material into a blank,
transferring the blank into a finishing mold by turning over the blank 180° with respect to a
horizontal axis, and blowing the blank through the collar in the finishing mold such that the
blank shapes into a hollow glass product. The cavity includes at least one input section which
20 is substantially vertical.

 The second object may be accomplished by a glass product including a body having at
least one part, and a collar formed on the body, wherein an axis of said collar is not parallel to
an axis of said at least one part.

 The third object may be accomplished by an individual section machine for
25 manufacturing a hollow glass product with an offset collar axis, including a roughing mold
having a cavity with at least one upper part, a finishing mold, and a collar mold including a
punch configured to form a collar of the hollow glass product and configured to position the
punch alternately in the roughing mold and finishing mold such that an axis of the punch

form an angle between 60° and 180° with respect to a vertical axis. The at least one upper part is substantially vertical.

5

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention and many of the attendant advantages thereof will become readily apparent with reference to the following detailed description, particularly when considered in conjunction with the accompanying drawings, in which:

10 Fig. 1 is a schematic view showing the first stage of the successive stages in the fabrication process of a product according to an embodiment of the present invention;

Fig. 2 is a schematic view showing the second stage of the successive stages in the fabrication process described above;

Fig. 3 is a schematic view showing the third stage of the successive stages in the fabrication process described above;

15 Fig. 4 is a schematic view showing the fourth stage of the successive stages in the fabrication process described above;

Fig. 5 is a schematic view showing the fifth stage of the successive stages in the fabrication process described above;

20 Fig. 6 is a schematic view showing the sixth stage of the successive stages in the fabrication process described above;

Fig. 7 is a schematic view showing the seventh stage of the successive stages in the fabrication process described above; and

Fig. 8 is a schematic view showing the final stage of the successive stages in the fabrication process described above.

25

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments will now be described with reference to the accompanying drawings, wherein like reference numerals designate corresponding or identical elements throughout the various drawings.

5 With reference to Fig. 1, a roughing mold 1, which is a part of an individual section machine, receives in its cavity 2 a molten ball of glass 3. A first part 4 of the cavity 2 by which the molten ball 3 enters is approximately vertical. In addition to the first part 4, the cavity 2 is also shaped by a second part 5, which comes after the first part 4, shorter than the latter and with which it forms an angle of 120° . The roughing mold 1 includes a housing for receiving a collar mold 6. The collar mold 6 includes a punch 7 and the axis of the punch 7, which is represented by the reference numeral 8. Th axis 8 of the punch 7, which is traditionally vertical, is also inclined in conformity with the present invention by 120° with respect to the first part 4.

10 Also shown is machine axis 9 located in the central plane of the roughing mold 1, an axis 10 representing one of the components of the subsequent turning motion described below, which causes the intermediate glass product to pass from the roughing mold 1 to a finishing mold as well as the axes 11, 12 of the first and second parts 4, 5, respectively, of the cavity 2.

15 As illustrated by Fig. 2, the glass fills a lower part of the cavity 2 and a collar 13 of a flask is shaped by driving-in of the punch 7. Following retraction of the punch 7, a blank is formed by injection of compressed air as indicated by the arrow in Fig. 3, that is, in the body of the blank through collar mold 6.

20 The blank is then transferred to a finishing mold 14 of the individual section machine by a turning-over movement, while the collar mold 6 is being used as a gripping element of the blank as shown in Fig. 4. Also shown in Fig. 4 is a machine axis 15 of the finishing mold 14, which also corresponds to the median plane of the finishing mold 14, and the axis 16 of the collar mold 6 fixed in the finishing mold 14. A cavity of the finishing mold 14 is

constructed in such a manner as to maintain the angle relationships existed between the axes 8, 11, 12 in the roughing mold 1.

The following stage shown in Fig. 5 includes a blasting unit head 17 replacing the collar mold 6 in the finishing mold 14. The blasting unit head 17 supplies compressed air into the interior of the blank through the collar 13, thereby shaping the blank into the flask. The axis of the blasting head 17 is offset by 120° with respect to the vertical in the same manner as the axis 16 of the collar mold 6.

The process then includes, for example, the following operations:

gripping the flask by means of tongs 18 after opening the finishing mold 14 as shown in Fig. 6;

repositioning the tongs 18 with offset distance of 120° with respect to the vertical in order to turn to take the next flask as shown in Fig. 8.

In the gripping operation, the tongs 18 is advantageously articulated in order to be oriented depending upon the center of gravity of the assembly unit, thereby preventing deformation of the collar 13 that is still fragile as shown in Fig. 7

Thus, the present invention provides a hollow product made of thermoplastic material, especially of glass with a complex shape, in which the collar axis is offset with respect to the axis of at least one part of the body of the product as well as a fabrication process of such a product. The quality of a product achieved according to the present invention is excellent, in particular, due to the fact that homogeneous distribution of the thermoplastic material in the molds, especially in the vicinity of the collar, limited contact of the molten ball with the walls of the roughing mold, thereby decreasing thermal transfer and optimizing viscosity and flow of the material and satisfactorily filling of the bottom of the cavity in the roughing mold are achieved.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

WHAT IS CLAIMED AS NEW AND IS DESIRED TO BE SECURED BY LETTERS

PATENT OF THE UNITED STATES IS:

1. A glass product comprising:

a body having at least one part; and

a collar formed on said body,

wherein an axis of said collar is not parallel to an axis of said at least one part.

2. The glass product of Claim 1, wherein said at least one part of said body comprises at least 20% of glass in the glass product.

3. The glass product of Claim 1, wherein said at least one part of said body comprises at least 60% of glass in the glass product.

4. The glass product of Claim 1, wherein said axis of said at least one part and said axis of said collar form an angle between 60° and 180° .

5. The glass product of Claim 4, wherein said axis of said at least one part of said body and said axis of said collar form an angle between 90° and 150° .

6. The glass product of Claim 1, wherein said glass product comprises a bottle.

7. The glass product of Claim 1, wherein said glass product comprises a flask.

8. The glass product of Claim 1, wherein said glass product comprises a jar.

9. A process of manufacturing a hollow glass product with an offset collar axis, comprising the steps of:

inserting molten glass into a cavity of a roughing mold, said cavity including at least one input section which is substantially vertical;

allowing the molten glass to penetrate into a bottom portion of said cavity;

perforating a collar by moving a punch into said bottom portion of said cavity along a non-vertical axis;

extracting said punch from said bottom portion of said cavity, thereby completing a process of shaping the molten glass into a blank with the collar;

transferring the blank into a finishing mold by turning over the blank 180° with respect to a horizontal axis; and

blowing the blank through the collar in said finishing mold such that the blank shapes into the hollow glass product.

10. The process of Claim 9, wherein said input section comprises at least 20% of the total volume of said cavity.

5 11. The process of Claim 9, wherein said input section comprises at least 60% of the total volume of said cavity.

12. The process of Claim 9, further comprising the step of blowing compressed air to force the molten glass toward the bottom of said cavity.

10 13. The process of Claim 9, wherein said punch moves in and out of said bottom portion of said cavity at an angle between 60° and 180° with respect to a vertical axis.

14. The process of Claim 13, wherein said punch moves in and out of said bottom portion of said cavity at an angle between 90° and 150° with respect to the vertical axis.

15. An individual section machine for manufacturing a hollow glass product with an offset collar axis, comprising:

15 a roughing mold having a cavity with at least one upper part, said at least one upper part being substantially vertical;

a finishing mold; and

20 a collar mold including a punch configured to form a collar of said hollow glass product and configured to position said punch alternately in said roughing and finishing molds such that an axis of said punch form an angle between 60° and 180° with respect to a vertical axis.

ABSTRACT OF THE DISCLOSURE

A process of manufacturing a hollow glass product with an offset collar axis, including the steps of inserting molten material into a cavity of a roughing mold, allowing the molten material to penetrate into a bottom portion of the roughing mold, perforating a collar by moving a punch into the bottom portion of the roughing mold along a non-vertical axis, extracting the punch from the bottom portion of the roughing mold, thereby completing processes of shaping the molten material into a blank, transferring the blank into a finishing mold by turning over the blank 180° with respect to a horizontal axis, and blowing the blank through the collar in the finishing mold such that the blank shapes into a hollow glass product. The cavity includes at least one input section which is substantially vertical.

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FIG. 1

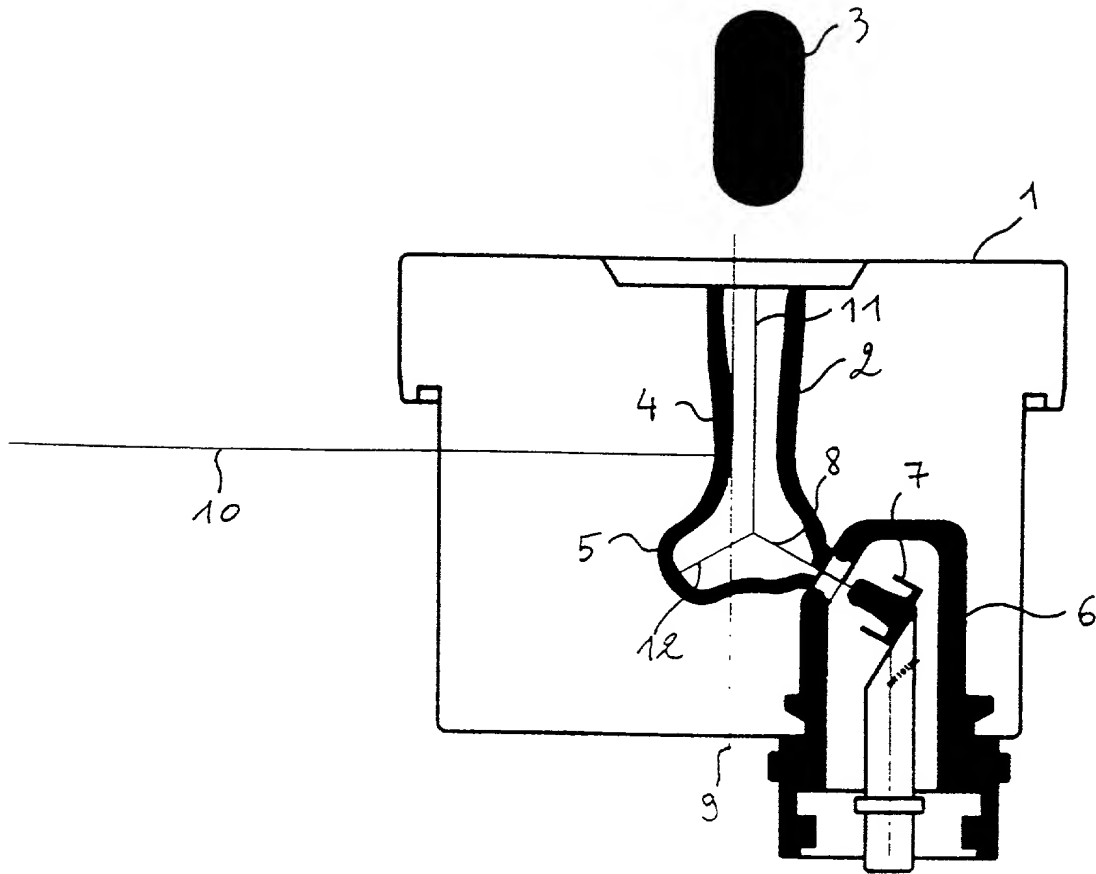


FIG. 2

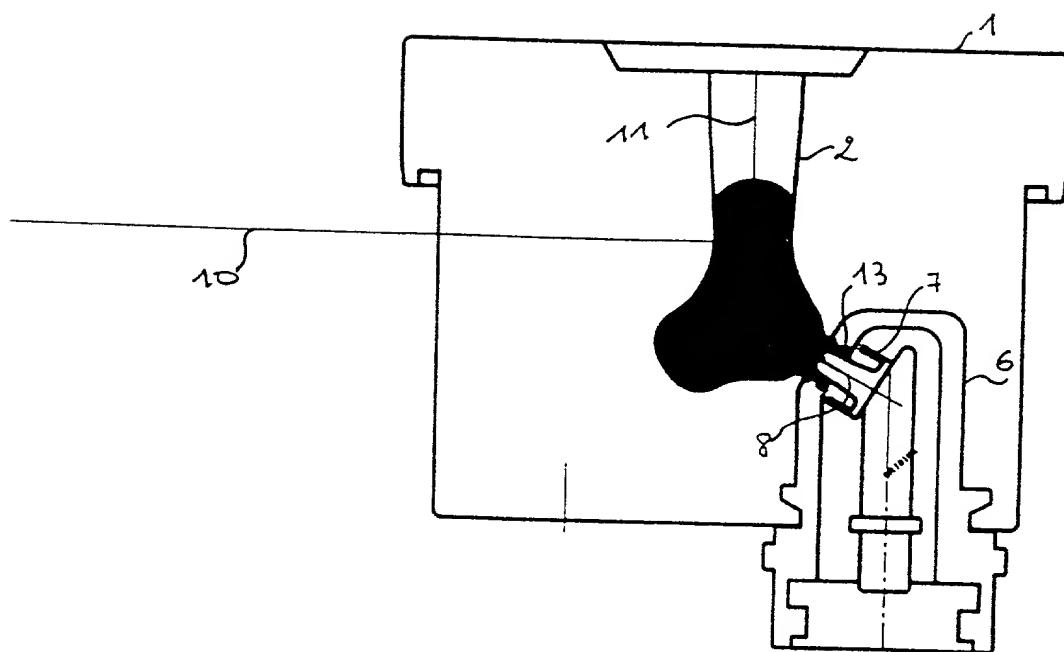


FIG. 3

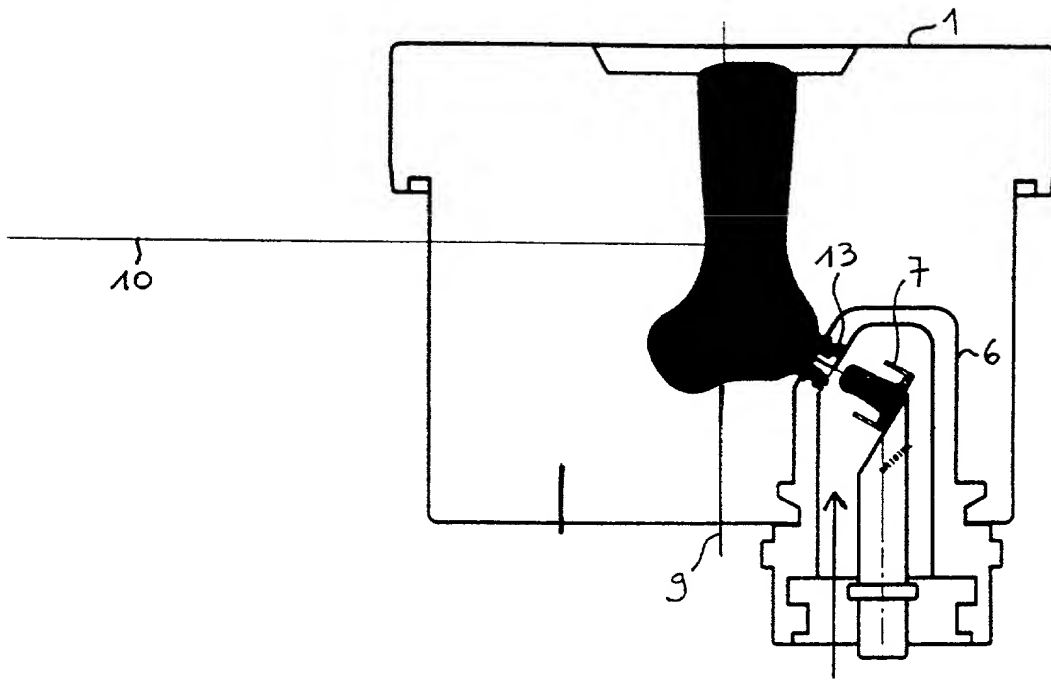


FIG. 4

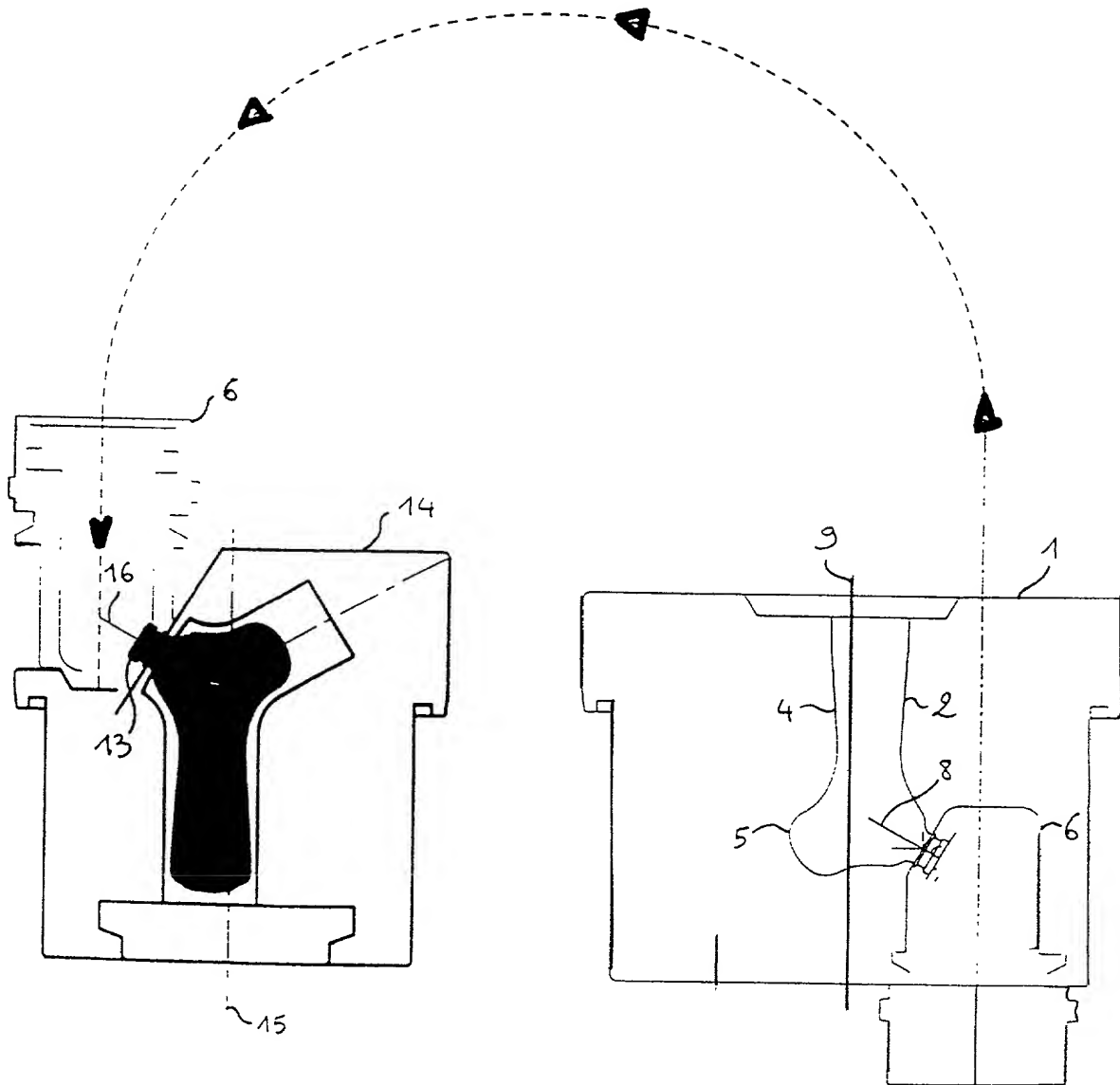


FIG. 5

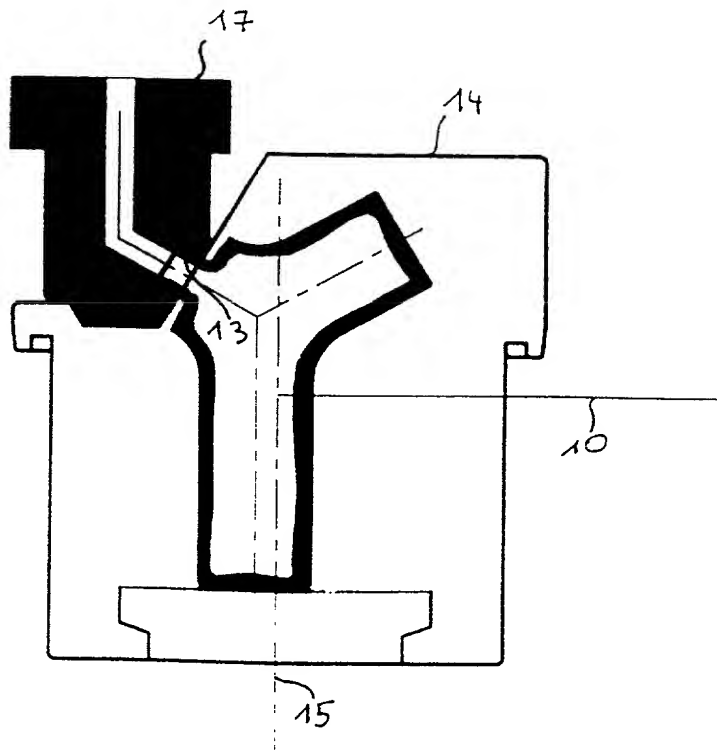


FIG. 6

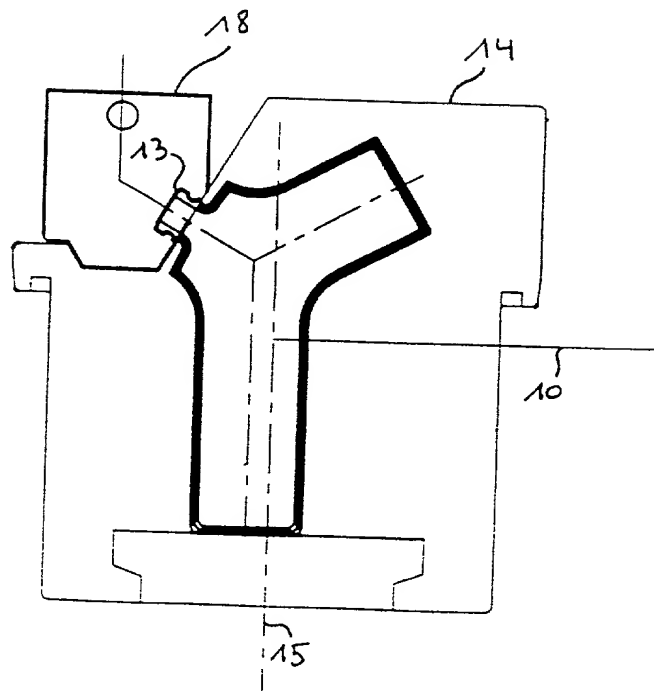


FIG. 7

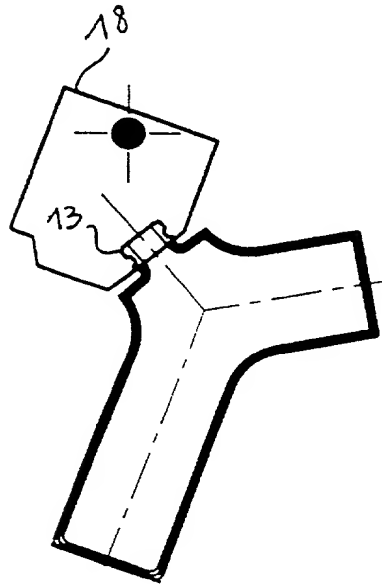
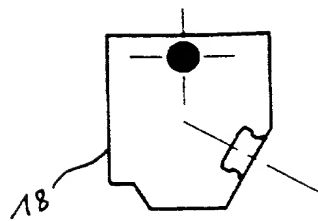


FIG. 8



Docket No. 1247-0862-6E

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Rémy Badin et al.

FILING DATE: Herewith

FOR: HOLLOW GLASS PRODUCT WITH OFFSET COLLAR AXIS AND PROCESS OF MANUFACTURE
THE SAME



LIST OF INVENTORS' NAMES AND ADDRESSES

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Listed below are the names and addresses of the inventors for the above-identified patent application.

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A declaration containing all the necessary information will be submitted at a later date.

Respectfully Submitted,

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